

**NMSS VIEWS REGARDING APPEAL OF DIFFERING PROFESSIONAL
VIEW CONCERNING MODELING CHEMICAL CONSEQUENCES AT
THE PROPOSED MOX FUEL FABRICATION FACILITY**

Mr. Murray's Safety Concern:

"The NRC is reviewing a license application that uses a code for safety determinations without adequate assurance of the site specific application and quality assurance to NRC standards, including site specific verification and validation of code results against actual site measurements. These safety concerns are further exacerbated by the code potentially under-predicting concentrations by one order of magnitude or more, as compared to other NRC-endorsed software and recent site applications by other organizations. Therefore, potential accident scenarios at the proposed facility may not have adequate safety strategies and design bases, as required by the regulation for a construction permit."

Regulatory Requirement:

10 CFR 70.23(b) - The Commission will approve construction of the principal structures, systems, and components of a plutonium processing and fuel fabrication plant on the basis of information filed pursuant to 70.22(f) when the Commission has determined that the design bases of principal structures, systems, and components, and the quality assurance program provide reasonable assurance of protection against natural phenomena and the consequences of potential accidents. Failure to obtain Commission approval prior to beginning of such construction may be grounds for denial of a license to possess and use special nuclear material in a plutonium processing and fuel fabrication plant.

Demonstration of Compliance:

Applicant used ARCON96. ARCON96 uses a straight line Gaussian model that permits the evaluation of ground-level, vent and elevated releases. Diffusion coefficients have three components; (1) diffusion coefficient used in other NRC models (2) correction to account for enhanced dispersion under low wind speed (3) correction to account for enhanced dispersion in building wakes. These correction factors were based on experiments under a wide variety of meteorological conditions that bound conditions at the site. ALOHA, which is asserted by Mr. Murray to be more conservative, does not take into account these site specific factors. ARCON96 calculates relative concentrations using hourly meteorological data. It then combines the hourly averages to estimate concentrations for periods ranging from 2 hours to 30 days. Relative concentrations that are exceeded no more than 5 per cent of the time (95th percentile relative concentrations) are determined from the cumulative frequency distributions for each averaging period.

Assumptions used by both the applicant and the staff in its independent evaluation are realistically conservative, as would be expected in a facility safety analysis. For example, no credit is taken for the mitigating effects of non-safety structures, systems or components, such as the ventilation stack elevation, vertical momentum of stack releases, or receptor elevations different than the release elevation.

Pedigree:

ARCON96, which was developed for NRR, is a revised version of ARCON95, which was developed for RES. ARCON95 was developed and tested in accordance with the requirements of ANSI/ASME NQA-1, 1986 edition, "Quality Assurance Program Requirements for Nuclear Facilities." Following the code modifications leading to ARCON96, the code developer verified ARCON96 code performance using the same six example cases used in the development of

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ARCON95.

ARCON96 is maintained under configuration control for the NRC at the Oak Ridge National Laboratory Radiation Safety Information Computational Center. Site specific parameters have been submitted by the licensee and have been independently confirmed by the staff. ARCON96 has been benchmarked against the Murphy-Campe procedure previously used by NRC for control room habitability assessments. ARCON96 overcomes the Murphy-Campe procedure's tendency to over predict concentrations during low wind speeds.. Use of tracer studies is unnecessary regulatory burden when appropriately benchmarked codes with site specific data are used.

The use of ARCON96 is specifically cited as an acceptable code for estimating near-field atmospheric dispersion in Regulatory Guide (RG) 1.78, "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release," RG 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," and RG 1.195, "Methods and Assumptions for Evaluating Radiological Consequences of Design Basis Accidents at Light-Water Nuclear Power Reactors."

QA:

ARCON96 is distributed with 5 sample input decks which are used to verify correct installation and performance of the code in the reviewer's computer.

Summary:

ARCON96 is an appropriate code for use in licensing of a MOX fuel fabrication facility at the Savannah River site. The code provides realistic results, has been benchmarked under conditions representative of the site, uses site specific parameters which have been independently verified by staff, is independently maintained under configuration control, and is used under appropriate QA by trained and experienced staff.

TIMELINESS OF RESPONSE:

DPV filed - 12/19/02

Panel Report to Marty Virgilio - 9/30/03

Director's Decision to Mr. Murray - 10/3/03 (DPV denied)

Director's Memo to FCSS 10/3/03 (required FCSS to confirm site specific data docketed)

FCSS Memo to Marty Virgilio completing actions 1/12/04

Mr. Murray's memo to FCSS on completed actions 1/22/04 (considered NMSS action rather than DPV appeal since questioned FCSS actions)

Marty Virgilio assigned to new position while preparing response (April 04)

Memo from Mr. Murray to Jack Strosnider requesting response 5/13/04

Strosnider Memo to Murray responding to May 13 memo from Mr. Murray October 7, 2004 (delay resulted from Office Director focus on detailed information to ensure appropriate response and time spent on issues such as consolidation under new management directive)

RECOMMENDATION:

ARCON96 is suitable for use for a MOX fuel fabrication facility at Savannah River site. Deny appeal.